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ABSTRACT

Three different theory of mind tasks were conducted with 4- to 8-year-old Quechua peasant children in the Peruvian Andes. The study investigated the ways in which children in preliterate cultures think and the possibility that they think differently than children in literate cultures. The tasks included: (1) a false-belief task, which tested the child's ability to represent another's mistaken belief; (2) an appearance/reality task, which tested the child's ability to represent both an object's appearance and what the object is; and (3) a representational change task, which tested the child's ability to represent both a false belief the child had previously held, and the child's present belief about an object. All three experiments were conducted in Quechua by a native Quechua speaker. Two major observations are reported. First, Quechua children of the ages studied appeared to have difficulty following the details of a story, even when the story was acted out with props. Second, the children had difficulty with questions that probed their understanding of their own and others' thoughts. The data suggest that Quechua children do not develop a theory of mind in early childhood that is comparable to the relatively complex theory of mind that young children in Western literate cultures develop. Although they may develop some metarepresentational capacity, they may not apply it to their own thoughts and the thoughts of others. This suggests that the development of a theory of mind may not be universal. Contains 12 references. (LB)

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Quechua Children's Theory of Mind

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Introduction

The author Annie Dillard, in her work entitled *An American Childhood*, describes how she used to be afraid to fall asleep at night, because a monster would come and try to attack her. It came in the form of a thin strip of light that would slip in at the door, race across the wall toward her, and, just before it reached her bed...disappear. She goes on to tell of how she realized one night that the sounds of the cars going by in the street which she heard in the daytime could also be heard at the exact time that the light hurtled across the wall toward her. For the first time she put together the outside world with the world inside her head. She writes,

> The world did not have me in mind; it had no mind. It was a coincidental collection of things, and people, of items, and I myself was one such item. The things in the world did not necessarily cause my overwhelming feelings; the feelings were inside me, beneath my skin, behind my ribs, within my skull. They were even, to some extent, under my control.

She discovered that she could enter into the fiction deliberately and replace it by reason deliberately...it's a monster - no, it's a car.

This is a good narrative description of one of the kinds of things people studying children's theory of mind are seeking to understand. At what age do children come to understand their own thoughts and the thoughts of others? How do they come to the understanding that they and others feel and act, not on the basis of what is really true about the world, but what they *think* is true about the world? Is the child's understanding about his own thoughts and beliefs systematically organized into some kind of theory of mind? These are just a few of the questions that the theories of mind people are researching.

One question which is just beginning to be addressed is the extent to which the children's understanding of minds is universal. Do all child develop a similar theory of mind, regardless of the culture in which they have been raised? Do children in preliterate cultures think differently from children raised in literate cultures, such as our own. What is at stake here is not simply a question as to whether or not one may know more or less about something, or know different things or possess different learning styles, but rather, do the cognitive processes themselves of preliterate peoples differ in systematic ways from our own.

In the area of children's theory of mind, considerable effort has been expended in seeking to describe the cognitive structures which develop in Western culture. Research has shown that children as young as 18 months old are developing an inner, mental world as they engage in pretend play (cf. Leslie 1988, Wellman 1985). By age 2 children are able to reason what another will do in order to get a desired object (Wellman and Wooley 1990). Three year olds can articulate a clear understanding of mental states as distinct from physical things - that a banana may be eaten but the thought of a banana cannot because it's 'in your head' (Wellman 1988). The notion of beliefs as affecting actions also begins to develop at age three. As Bartsch and Wellman (1989) have shown, children are able to give

explanations of behaviour in terms of belief around their third birthday. It is not until later, however, that they can *predict* behaviour based on someone's belief.

At about age four, children begin to understand for the first time that others not only think and believe differently from themselves, but that others act on the basis of their beliefs, and can even have false beliefs (Perner, Leekam and Wimmer 1987). Also at this age children are able to distinguish between how an object appears and what it really is (Flavell, Flavell and Green 1983, 1987), and between their own prior mistaken and their present true belief (Astington and Gopnik 1988).

What some of us think is happening at this stage of development is that children begin to think of themselves and others as acting on the basis of representations of the world, that is, mental events, rather than as acting *directly* on the world - rather like the way Annie Dillard found that her fear was based on what she *thought* about the world, rather than what was actually happening in the world. Up to this point, children have understood something about mental states in themselves and others - they know that they themselves and others have thoughts, beliefs, wants, etc., and that these mental states are separate from the world. Now this knowledge starts to coalesce into a principled model of how people's thoughts, desires and feelings relate to their behaviour and states of affairs in the real world. In other words, they develop a theory of mind.

A wide variety of tasks exploring children's developing theory of mind have provided evidence for this major shift in understanding occuring around age four. A series of these tasks, suitably adapted for cultural differences, has been conducted among the Quechua, a peasant culture living in the high Andes of Peru. Results of these studies suggest that Quechua children develop a somewhat different theory of mind than North American children. Specifically, these data suggest that they have difficulty representing mistaken beliefs.

Three different theory of mind tasks have been been conducted among the Quechua to date. They are a false belief task, which tests children's ability to represent another's belief which is in conflict with reality (i.e. another's mistaken belief); an appearance/reality task, which tests children's ability to represent both how an object appears and what it really is; and a representational change task, which tests the child's ability to represent both his own prior false belief and his present true belief about an object. In the time available, only a brief surface analysis of the data will be presented. A more detailed account is available upon request.

Subjects ranged in age from 4-8 years. Exact ages were difficult to obtain, because parents were not always available for consultation. In order to deal with this problem for the majority of statistical analysis I have divided the subjects into two groupings - those under six and those six and over.

All three experiments were originally written in Spanish by the author, then translated into Quechua with a native speaker of Quechua who has considerable training in translation priniciples. All experiments were conducted in Quechua by a native Quechua speaker.

Experiment 1: False Belief

This first study modified Perner, Leekam and Wimmer's 1987 false belief task, and provided an opportunity to explore children's understanding of false belief in others without using explicit language of thought or belief. Eighteen younger and fifteen older children were tested.

Procedure

The task is embedded in a story about a child, Shanti, who goes to look for his candy after, unbeknownst to him, it has been moved by his mother to a different location. Two crucial test questions were asked, as well as several control questions:

Question 1: Where will Shanti look for the candy? (look)
Question 2: Which container does Shanti think the candy is in? (think)
Question 3: Where is the candy really? (location)
Question 4: Do you remember where Shanti first put the candy? (remember)
Question 5: Where did his mother put the candy? (mother put)
Question 6: Where was Shanti when his mother moved the candy? (where Shanti)
Question 7: Did Shanti see where his mother put the candy? (see)

Questions 1 and 2 are the crucial questions, which probe the child's understanding of the story character's false belief. These two questions were asked first and last in the series of questions, in counterbalanced order. Questions 3-7 are control questions which test the child's comprehension of the basic facts of the story, and were always asked in the order indicated above.

Results

A mean number correct on all questions was calculated for each age group. The mean score for the older group was 5.13; the younger group's mean score was 3.22. A T-test revealed that the older group performed significantly better overall than the younger group ($p < .001$).

On Question 1 (where will he look), the older children performed significantly better than the the younger group ($p < .01$), with 71.4% of the older group and 28.6% of the younger group performing correctly. The older group did *not*, however, perform significantly better than the younger group on Question 2 (where will he think) - only 46.7% of older and 27.8% of younger children correctly answered the think question.

The performance of the younger group on several of the control questions was at or below chance. For example, only 38.9% of the younger children correctly remembered where Shanti put the candy, and only 55.6% knew where Shanti was when his mother moved the candy. The older children performed slightly better. In fact, of the older children correctly answering the look question, percentages of

correct answers on the control questions ranged between 80 for the remember question (#4) and 100 for the see question (#7).

Discussion

These results indicate that the youngest group just doesn't seem to be able to follow the story, much less predict behaviour based on mental states. The older children do seem better able to predict behaviour if they get the facts straight. But they still don't always get the facts straight. The oldest group, may be at a transition point where they are better able to follow the story, and to predict behaviour from mental states, but they still have difficulty with the task. If this is so, then we should expect that 8-10 year olds will have little difficulty with this task.

The question then becomes, why do these children have so much trouble getting the facts of the story? The most obvious answer is lack of practice. In the first place, Quechua adult/child interaction seems to be minimal, compared to North American culture. Reading has almost no place in the culture, much less reading to children, much less questioning children on the content of stories. While oral story-telling does occur, it is not as common as reading books to children is in our culture, and children are not to my knowledge ever questioned about the stories. Furthermore, most of these children have not been to school, which is the location in which one is most likely to find the asking of questions to which the interrogator already knows the answer.

Another hypothesis as to why these children have difficulty with this task is that there may be a 4-5 year difference in the onset of their understanding of false belief, due to factors such as poor diet, cultural differences such as quantity and quality of pretend play. A third hypothesis is that Quechua children simply have difficulty thinking about the thoughts of others. If this is true, we might expect older children to be better at answering the control questions, but not consistently to answer the crucial false belief questions correctly.

What still remains puzzling with this task is why the older children can answer the look question better than the think question. In Western literate cultures, it has been assumed that these questions tap the same representational capacity - therefore if you can answer one correctly, you should be able to answer the other correctly. Yet older Quechua children seem to find the look question easier than the think question. Further study will need to be done to determine whether the Quechua children are answering the look question on the basis of their understanding of the other's thoughts, or on some other basis. We'll discuss what that "other basis" might be in what follows.

Experiment 2: Appearance/Reality

This task was modelled on the work of Flavell et al. (1983, 1987) which examines children's ability to distinguish between what an object appears to be and what it really is.

Procedure

Two items were presented to the subjects; first, a sponge that looked like a rock, then a pen that looked like a carrot. This task was not embedded in a story, which contrasts with the False Belief experiment. The method of questioning, which involved giving the child a forced choice, also contrasts with the False Belief experiment, which used short answer questions.

A number of questions were asked for this tasks, some of which tested their understanding of the appearance/reality distinction and some of which tested their understanding of their own and another's false belief. Both the order of questions and the order of the forced choice were counter-balanced.

Question 1: What is this? (identity)

Question 2: Before you touched it, just looking at it, what did you think it was - a sponge or a rock? (self think)

Question 3: What does it look like- a sponge or a rock? (appearance)

Question 4: What is it really - a sponge or a rock? (reality)

Question 5: Shanti hasn't touched it. If he just looks at it, what will he think it is - a sponge or a rock? (other think)

Results

Let's deal with the think questions first. Neither group performed above chance on the questions which probed their understanding of their own and another's mistaken beliefs (the 'self think' and 'other think' questions). Overall, both do slightly better on what they orginally thought the object was than on what another would think it was.

Half of the younger group answered both the appearance and reality questions correctly on both tasks; 66.7% and 86.7% of the older groups answered both questions correctly on task 1 and 2 respectively. The number of children who understand the appearance/reality distinction exceeds chance for *both* age groups (younger, tasks 1 & 2 $p < .05$; older, task 1 $p < .01$, task 2 $p < .001$). The older group appears to have reached a ceiling in performance, whereas the younger group is at a transitional point in their understanding of the appearance/reality distinction.

In order to assess what another might *think* the object is, it is necessary to understand what the object appears to be and what it really is. So, it might be argued, only those children who can correctly answer both the appearance and the reality questions should be able to answer what another might think the object is. This is not the case, however, with the Quechua subjects. Of the younger group, only 50% of those correctly answering the appearance and reality questions also answered the self think questions correctly, and only 33.3% answered the other think questions correctly. For the older group answering appearance and reality questions correctly, only 61.5% (task one) and 70% (task two) answered the think questions correctly.

Discussion

The results of this experiment contrast with results of theory of mind tasks conducted among Western literate children. As has been mentioned, prior to this Quechua research it has been assumed that ability to perform correctly on false belief, appearance-reality, and representational change tasks occurs at the same point in the cognitive development of children, namely around the age of four. Quechua children, however, do not appear to develop an understanding of their own and others' false beliefs and an understanding of the appearance/reality distinction at the same time. The children who are able to perform correctly on the appearance *and* the reality questions are still not able to respond correctly to the question probing their understanding of either another's thoughts or their own thoughts.

Is it possible that the understanding of appearance/reality distinction and the understanding of false belief draw on distinct cognitive capacities? As yet we have no evidence that Quechua speakers *never* develop an understanding of false belief, so it is difficult to prove or disprove this hypothesis. However, the Quechua language does offer some evidence which may support this alternative. First, it has no words for "thought" or "belief". Yet the particular dialect of Quechua in which these studies were conducted is rich in vocabulary for describing both the appearances of things and their reality. Thus Quechua children may simply be used to thinking of objects in this dual manner. The deeper question, however, is, *why* is the Quechua language this way? It may simply reflect how its speakers view the world. Like the Stoics, they may see appearances as being a part of objects, part of their identity.

With regard to understanding false belief, however, their lack of vocabulary to express such things may indicate that Quechuas just don't reflect on their own or others' thoughts very much. They may live their lives mainly on the level of events and reactions to events, with little thought given as to how people's thoughts might affect their actions. In Bruner's terms, they may live almost entirely on the landscape of action, and not on the landscape of consciousness.

Experiment 3: Representational Change

This experiment followed Gopnik and Astington's (1988) representational change task which explores the child's understanding of her own change in belief. The experiment focused on an container with surprising contents.

Procedure

The first part of the experiment was a control task in which the children saw a matchbox, it was opened, the contents (matches) removed and pebbles put in. Then the box was closed. The real task was a covered sugarbowl filled with potatoes. Children did not change the contents.

Question 1: Before I opened the box, when you were just looking at it, what did you think was in it? (self think control)
Question 2: Shanti hasn't seen inside the box. Just looking at it, what will he think is in it? (other think control)
Question 3: What is this? (I.D.)
Question 4: Before I opened this, when you were just looking at it, what did you think (Spanish verb) was in it? (self think Spanish)
Question 5: Shanti hasn't seen inside this. Just looking at it, what will he think (Quechua verb) is in it? (other think)
Question 6: Before I opened this, when you were just looking at it, what did you think (Quechua verb) was in it? (self think Quechua)

The 'self think' question was asked twice, once using a Spanish loan word for 'think' (#4) and once with the Quechua equivalent (#6), a form of the verb 'say' which was used in all other questions. These questions were asked in counterbalanced order.

Results

A mean number correct on all questions was calculated for each age group. The mean number correct for the older group was 2.6 and for the younger group, 2.06, out of a total of 6 questions. A t-test revealed that this was not a significant difference. Only the younger group performed significantly above chance on any of the think questions - and that on the self think control question!

It doesn't take a t test or any other kind of test to see that all the children did pretty poorly on this test. Many of the children simply refused to answer some of the questions on this test. The order in which the tests were given were counterbalanced, so it was not simply a matter of the children getting tired.

Discussion

Why do Quechua children have so much difficulty with this task, especially with their own change in belief? My hypothesis is that they see this task as an attempt to trick them. Tricking people, playing jokes on people, is a significant part of Quechua culture. To avoid looking as if they have been tricked they *claim* to know the actual contents of the sugarbowl.

Why is a surprising *contents* viewed as a trick, but the object with the surprising *identity* (in the appearance/reality task) is not viewed as a trick? Perhaps, as has been mentioned, the Quechua see appearances as inherently part of objects. Thus in the appearance/reality task they don't feel as if the experimenter is tricking them. They may feel as if the object is tricking them, which they don't mind, or perhaps they don't feel tricked by the object at all, because objects aren't intentional beings for them. Whatever their view of intentionality and inanimate objects, for Quechua children a sponge/rock seems to be simply an amusing object. The sugarbowl containing potatoes, on the other hand, is not one thing appearing as something else - the sugarbowl really is a sugarbowl and the

potatoes really are potatoes! What is happening is that the experimenter wants to deceive them. The correct response is to not let on that you have been tricked.

I'm not saying that the Quechua children are intentionally setting out to deceive the experimenter. As Chandler (1989) and others have argued, there is good reason to think that a child who can intentionally deceive must understand false belief, for deception is the creation of a false belief in another. What I am suggesting is that Quechua children in this representational change task are playing a more primitive version of the deception game. Their simple rules are:

1) if you're surprised it must be a trick.
2) tricks make you look dumb.
3) so...say you knew what it was (i.e. don't act surprised).

With this strategy they're not trying to trick the experimenter. They are merely reacting to being tricked - and you don't need to represent another's thoughts to put this strategy into effect. Tricking someone is not making someone *think* something, but making them *do* something. They are not intending to deceive - although deception may be the *unintended* outcome. They are merely trying to avoid looking silly.

Conclusion

In the three experiments reported above, several observations seem clear. First, Quechua children between ages 4 and 8 appear to have difficulty following the details of a story, even when that story is "acted out" with the aid of props. They do seem to be able to answer a series of questions, because across all the experiments there are certain questions, both short answer and forced choice, which they have little trouble in answering correctly.

Secondly, across all experiments, Quechua children of these ages have difficulty with questions which probe their understanding of their own and others' thoughts, performing at or significantly below chance on all the 'think' questions. This contrasts with their ability to understand the appearance/reality distinction, for a signficant number of both age groups do understand this distinction, and the older group (6-8 years of age) appear to have reached a ceiling in their performance.

In short, these data suggest that Quechua children do not develop a theory of mind in early childhood which is comparable to the relatively complex theory of mind which young children in Western literate cultures develop. Specifically, while they may develop some metarepresentational capacity, they may not apply it to their own thoughts and the thoughts of others. This suggests that the development of a theory of mind may not be not universal - neither with respect to the kinds of cognitive structures which develop, nor the sequence in which they develop, nor the age at which the various structures are observed in children.

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